Drive & Control profile

Viewpoint

Machine tool programming: Open Core Engineering opens new possibilities

Machines used in metalworking and manufacturing rely on some of the most complex automation platforms, employing advanced and powerful CNC and PLC systems to precisely control multi-axis interpolated motion sequences. There has been an ongoing effort to streamline the programming of these systems by developing programming languages and platforms that are more "open" and easier to use. These efforts are also being done to add more functionality to machine tools, such as more user-friendly operator interfaces (HMIs), visualization capabilities and real-time data capturing capabilities.

While industry code programming standards such as IEC61131 have helped improve machine automation programming, "open" is a relative term. Many programmers—including those recently out of school, or with backgrounds in computers, networking, and Web applications—are well-versed in standard programming languages like C++, Visual Basic for Applications (VBA) and Java, or mobile platforms such as Android and Apple iOS.

However, when they start working in an industrial environment—either for an operation with multiple machine

Open Core Engineering is a new approach to machine automation programming that combines the previously separate environments of PLC platforms and IT programming into one comprehensive software portfolio.

tools in use, or for a machine tool OEM—they must learn to program tooling applications using languages that are very specific to industrial controls, most often based on ladder logic. These programmers may have innovative ideas for new machine capabilities that can be created more easily with higher-level languages commonly used in the IT world.

Developing those applications using traditional PLC programming tools can be difficult and time consuming.

For example: A machine tool builder wants to offer his customer a tool and data management HMI that operates on mobile devices so the operator can move freely between the tool room and the machines. A programmer might use a Java or Android platform to author the application. However, it can be challenging to have that application communicate with the machine's control platform. It can be done, but it can take multiple software steps, instead of simple function blocks.

A new automation functionality in the form of Open Core Engineering is helping address this need. Open Core Engineering is a fresh approach to machine automation programming that combines the previously separate environments of PLC and CNC platforms and IT programming into one comprehensive software portfolio.

With Open Core Engineering, the controller's "core" PLC and CNC kernel is opened to enable programmers who use IT industry standard development tools such as C++, VBA and Java to create automation functions and applications as an alternative to utilizing IEC61131 programming environments.

Open Core Engineering offers a portfolio of software tools, function packages and support for higher-level languages. It helps streamline the automation engineering workflow, from initial machine configuration to actual production operations. This is especially true for many ancillary machine tool functions, such as data gathering, remote diagnostics and real-time machining visualization without the use of cameras.

For external applications, such as energy and cycle time analyzers, a library of Open Core Engineering functions utilizes a programming interface (Open Core Interface) to allow programmers to create high-level language-based applications that communicate directly to the core of the controller.

With this programming freedom it will be easier to engineer and machine a new part. Rather than taking a tool offline, Open Core Engineering capabilities enable the use of an external program to enter data for a part, load the part parameters into the CNC via the Open Core Interface, cut the part and capture and visualize the tool path data.

Open Core Engineering will "open" up a new range of possibilities for flexibility and productivity. It means more innovation, as software professionals and programmers who are experienced with technologies like mobile platforms and smartphones will not necessarily need to become experts in IEC 61131 PLC programming languages. The end result is that machine tool OEMs and end-users will have a wider range of programming capabilities to improve machining performance, versatility and productivity.
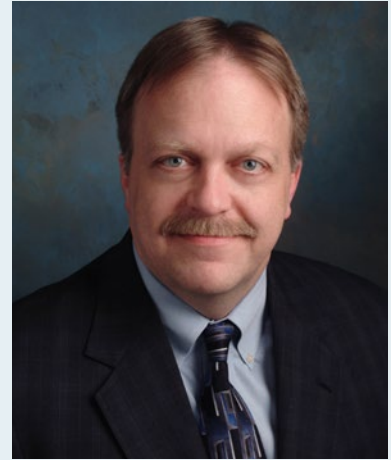
Scott Hibbard
Vice President of Technology
Bosch Rexroth Corporation
Charlotte, NC
(www.boschrexroth-us.com)

The Drive & Control Company

REXROTH
Bosch Group